



HIGHER SCHOOL CERTIFICATE EXAMINATION

1998

COMPUTING STUDIES

2/3 UNIT (COMMON)

SECTION I—CORE

(40 Marks)

*Total time allowed for Sections I and II—Three hours
(Plus 5 minutes reading time)*

DIRECTIONS TO CANDIDATES

Part A (20 marks)

- Attempt ALL questions.
- Write your Student Number and Centre Number on the Answer Sheet provided.
- Complete your answers in blue or black pen, or in pencil on the Answer Sheet provided.

Part B (20 marks)

- Attempt BOTH questions.
- Write your Student Number and Centre Number in the spaces provided on the first page of each question.
- Answer the questions in the spaces provided in this paper.

PART A

(20 Marks)

Attempt ALL questions.

Each question is worth 1 mark.

Select the alternative A, B, C or D that best answers the question.

Complete your answers in blue or black pen, or in pencil on the Answer Sheet provided.

1. The tool that indicates the time frame for the different stages of the system development would be
 - (A) a Gantt chart.
 - (B) a decision table.
 - (C) a data flow diagram.
 - (D) an organisation chart.

2. The first stage of the system development cycle is
 - (A) user oriented.
 - (B) designer oriented.
 - (C) technically oriented.
 - (D) programmer oriented.

3. An activity carried out during detailed system design is
 - (A) implementing software.
 - (B) evaluating feasibility factors.
 - (C) setting the priority of projects.
 - (D) setting the layout for printed reports.

USE THE FOLLOWING INFORMATION TO ANSWER QUESTIONS 4–7.

A school is introducing an electronic roll-marking system. This will replace its manual method of checking students' attendance at examinations. The new system will be used to check the attendance of one group of students. After this, the number of groups will be gradually increased until the system is totally implemented.

Each student using the system receives a swipe card with a unique barcode. As a student enters the examination room the card is read by a barcode reader.

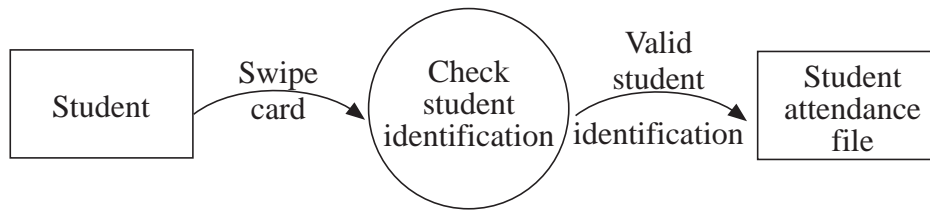
When evaluating the system, staff indicate that the new system is slower than the old system but that the attendance checking is much easier.

4. The method that best describes the conversion from manual to electronic attendance checking is
 - (A) pilot.
 - (B) direct.
 - (C) phased.
 - (D) parallel.

5. In which stage of the system development cycle would the type of barcode reader have been chosen?
 - (A) Design
 - (B) Analysis
 - (C) Requirements definition
 - (D) Implementation and testing

6. In which stage of the system development cycle would the staff have been trained to use the proposed system?
 - (A) Design
 - (B) Analysis
 - (C) Operation and evaluation
 - (D) Implementation and testing

7. Part of the systems documentation appears below.



This is an example of a

- (A) decision tree.
 - (B) function chart.
 - (C) systems flowchart.
 - (D) data flow diagram.
8. When a system has been developed, the most likely location of a detailed description of each field in a database would be a
- (A) data file.
 - (B) user manual.
 - (C) data dictionary.
 - (D) technical manual.
9. The person who develops a system design to meet a new need or solve a problem in an existing situation is called a
- (A) programmer.
 - (B) systems analyst.
 - (C) systems manager.
 - (D) data entry operator.

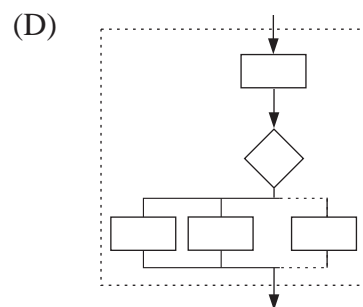
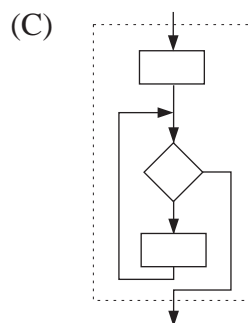
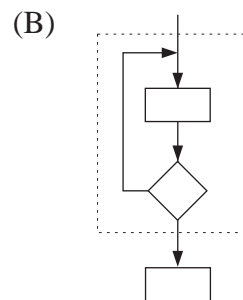
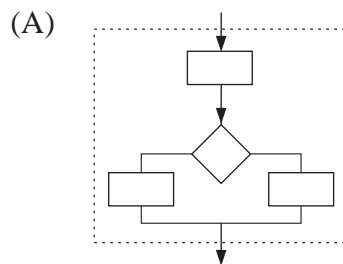
10. A company purchases a word processing package for its employees to use at work. One employee borrows the word processing package and installs this software on their home computer. The issue that relates to this activity is

- (A) ethics.
- (B) equity.
- (C) privacy.
- (D) changing nature of work.

11. Confirming the validity of the written version of an algorithm using test data is called

- (A) flowcharting.
- (B) desk checking.
- (C) data verification.
- (D) standards checking.

12. The flowchart structure that best shows a post-test is



13. The following data structure is used by a computer program.

GMH	RUIZ	MAGS	3.76	03/06/97	GREEN	123
-----	------	------	------	----------	-------	-----

This is an example of

- (A) a simple record.
 - (B) an indexed array.
 - (C) a multiway sequence.
 - (D) a one-dimensional array.
14. The values stored in an array are shown below.

32	38	46	53	27	36	51
----	----	----	----	----	----	----

The most efficient way to search for a specified data element in this array is by using

- (A) a linear search.
 - (B) a binary search.
 - (C) a selection search.
 - (D) an insertion search.
15. The values stored in an array are shown below.

1	2	3	4	5	6
31	2	23	39	97	20

The result produced by the first pass of an ascending *bubble* sort would be

- (A)

2	20	23	31	39	97
---	----	----	----	----	----
- (B)

97	39	31	23	20	2
----	----	----	----	----	---
- (C)

2	23	31	39	97	20
---	----	----	----	----	----
- (D)

2	23	31	39	20	97
---	----	----	----	----	----

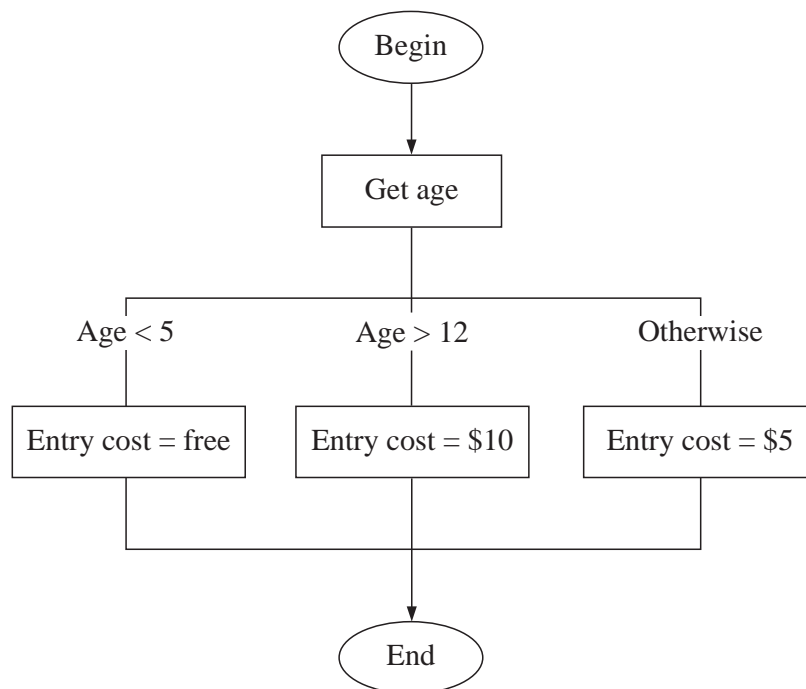
16. BEGIN
 set A = 2
 WHILE A < 7
 read B
 set A = A + B
 print A
 ENDWHILE
 END

If the values available for B in the above algorithm are

1, 3, 1, 1, 5,

then the output from the algorithm would be

- (A) 3, 6, 7
 (B) 3, 6, 7, 8
 (C) 2, 3, 6, 7
 (D) 3, 5, 3, 4, 7
17. An algorithm to determine the entry fee to an amusement park would be



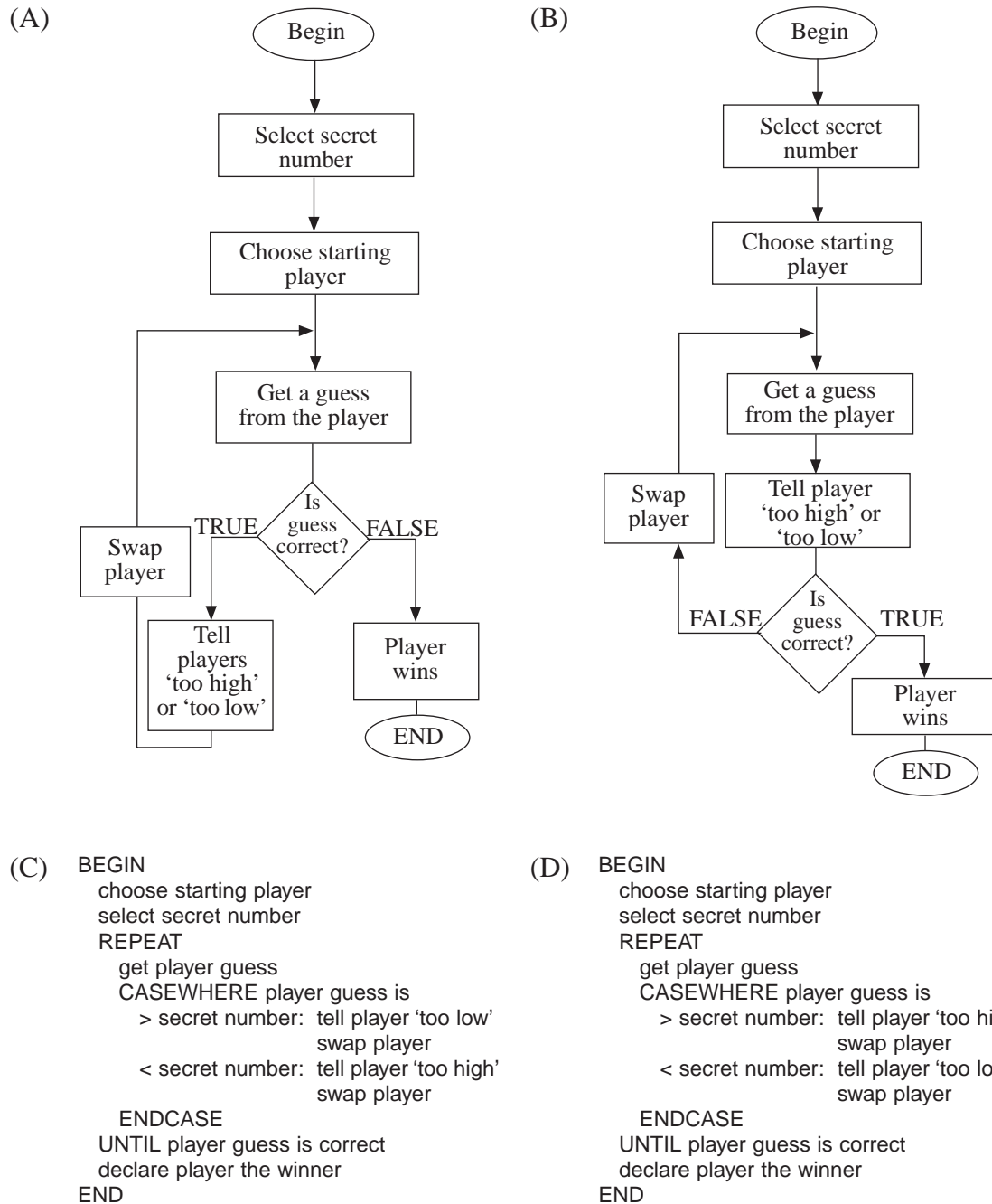
A minimum test set for the algorithm is

- (A) 4, 13
 (B) 4, 5, 13
 (C) 4, 5, 12, 13
 (D) 4, 5, 12, 13, 15

USE THE FOLLOWING INFORMATION TO ANSWER QUESTIONS 18 AND 19.

Two players take turns until they guess a secret number. After each guess the player is told if the guess is too low, too high, or correct.

18. The algorithm that best illustrates this game is



19. One player employs the strategy of choosing the middle value from the remaining range of numbers left. This strategy is closest to a
- (A) bubble sort.
 - (B) linear search.
 - (C) binary search.
 - (D) insertion sort.
20. The process of iteration best represented in pseudocode is
- (A) IF counter < 10 THEN increment counter by 1
ENDIF
 - (B) WHILE counter < 10
 display counter
 increment counter by 1
ENDWHILE
 - (C) CASEWHERE iteration
 required : increment counter by 1
 not required : increment counter by 2
ENDCASE
 - (D) BEGIN SUBPROGRAM
 iteration
END SUBPROGRAM

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MARKER'S USE ONLY

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STUDENT NUMBER

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1998**HIGHER SCHOOL CERTIFICATE EXAMINATION
COMPUTING STUDIES****2/3 UNIT (COMMON)—SECTION I****CENTRE NUMBER**

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PART B
(20 Marks)

Marks

Attempt BOTH questions.

QUESTION 21. Computer-based Systems (10 marks)

- (a) (i) Why should new computer-based systems be evaluated after installation? **5**

.....

.....

- (ii) Name and describe TWO components of a data flow diagram.

1. Name

Description

.....

2. Name

Description

.....

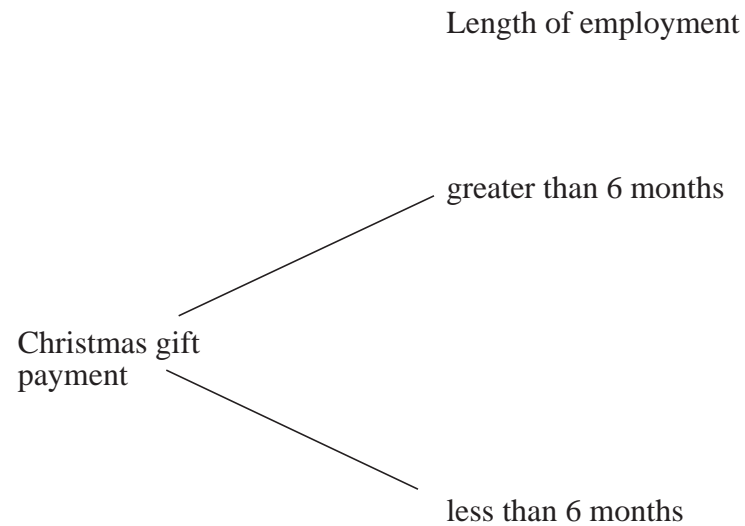
Question 21 continues on page 14

QUESTION 21. (Continued)

Marks

- (iii) At Christmas, a company pays a gift of money to some of its employees. To be eligible for the gift, an employee must have worked for the company for at least six months. Managers get \$500 and other employees get \$300 for their first Christmas with the company and \$500 thereafter.

Complete the decision tree below to clarify the decision logic of the system.



QUESTION 21. (Continued)

Marks

- (b) (i) The diagram below is an outline for a typical feasibility study report. Explanations of content have been included for some sections of the report. Write a description of the content to be included in a feasibility study report for: **5**

E. Alternatives considered;

H. Appendix.

Write your answers in the diagram below.

A. Title page	Project name, report title, author(s), date
B. Contents	A list of report sections with page numbers
C. Summary of findings	A clear, concise, one-page summary of the feasibility study, the results and the recommendations. Include authorisations, sources, alternatives considered and alternatives rejected. Describe the costs, benefits, constraints and time schedule associated with the recommended alternative.
D. Problem definition	A one-page description of the problem
E. Alternatives considered	
F. Recommendations	Clearly state and justify your recommended course of action. Explain why you selected this alternative.
G. Development plan	Assuming that the recommended course of action is adopted, include a projected schedule and projected costs for each step in the system development cycle.
H. Appendix	

QUESTION 21. (Continued)

Marks

- (ii) The following is a decision table containing nine rules for a scenario.

	RULES								
CONDITIONS	1	2	3	4	5	6	7	8	9
Condition 1	Y	N	Y	Y	Y	Y	N	Y	N
Condition 2	Y	Y	N	Y	Y	N	N	N	N
Condition 3	F	F	F	M	P	P	P	M	M
ACTIONS									
Action 1	×			×	×				
Action 2		×						×	×
Action 3							×		
Action 4			×			×			

The decision table contains redundant information and can be reduced to six rules. For example, Rules 8 and 9 have been combined to produce one rule as shown below. Similarly, Rules 1, 4 and 5 can be combined to produce ONE rule. Complete this new table.

	RULES					
CONDITIONS	1	2	3	4	5	6
Condition 1						—
Condition 2						N
Condition 3						M
ACTIONS						
Action 1						
Action 2						×
Action 3						
Action 4						

MARKER'S USE ONLY**STUDENT NUMBER****1998****HIGHER SCHOOL CERTIFICATE EXAMINATION
COMPUTING STUDIES****2/3 UNIT (COMMON)—SECTION I, PART B**

CENTRE NUMBER

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QUESTION 22. Algorithm Design (10 marks)**Marks**

- (a) The *face value* of a card can be

5

2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, King, Ace or Joker.

A game is played with a deck of cards that contains one Joker. The deck is shuffled and then cards are dealt out one at a time until the Joker is reached. One point is received for each card dealt before the Joker appears. The CARD GAME algorithm below illustrates this process.

LINE

```
① BEGIN CARD GAME
②   Shuffle cards
③   Points = 0
④   REPEAT
⑤     READ card
⑥     PRINT face value of card
⑦     Points = Points + 1
⑧   UNTIL card = Joker
⑨   PRINT points
⑩ END CARD GAME
```

- (i) Using pseudocode OR a flowchart, modify the CARD GAME algorithm so that it will not print out the face value of the Joker. Indicate the line numbers of all affected statements.

QUESTION 22. (Continued)

Marks

- (ii) There is at least one error in the scoring of the CARD GAME algorithm. Describe ONE error and explain how it might be fixed.

QUESTION 22. (Continued)

Marks

- (iii) A player's scores for ten turns of the CARD GAME algorithm have been recorded in the array SCORES below.

8	22	4	16	10	20	16	34	24	30
---	----	---	----	----	----	----	----	----	----

Using EITHER pseudocode OR a flowchart, write an algorithm that will

- read the scores into the array;
- search the array SCORES;
- record the highest score in a variable called HIGH VALUE.

Your algorithm should print the highest score before it ends.

(You may use the following page as well as this page to answer this part.)

QUESTION 22. (Continued)

WORKING PAGE

QUESTION 22. (Continued)

Marks

- (b) A lift has a computer-controlled alarm system and automatic sensors that can detect whether people are in it. The lift is monitored continuously in its operation. **5**

- (i) If the lift has a fault and stops between floors, one of two types of alarms is signalled.

Priority 1—if people are in the lift. A recorded message is played ‘HELP IS ON THE WAY’ and an alarm is sounded.

Priority 2—if no people are in the lift. No message is played but an alarm is sounded.

Using pseudocode OR a flowchart, write an algorithm, in the space below, to show the lift’s warning system.

QUESTION 22. (Continued)

Marks

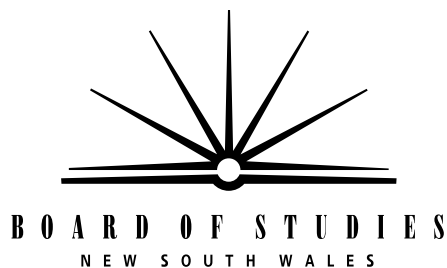
- (ii) If a fire occurs in the building, the lift is programmed to stop at the nearest floor. The alarm system plays a recorded message ‘FIRE—DO NOT USE LIFT’. When there are no people in the lift, the water sprinkler system is activated.

Using pseudocode OR a flowchart, write an algorithm to show the lift’s fire warning system. You must include the consequences for BOTH the fire occurring AND the fire not occurring.

(You may use the following page as well as this page to answer this part.)

QUESTION 22. (Continued)

WORKING PAGE



HIGHER SCHOOL CERTIFICATE EXAMINATION

1998

COMPUTING STUDIES

2/3 UNIT (COMMON)

SECTION II—OPTIONS

(60 Marks)

*Total time allowed for Sections I and II—Three hours
(Plus 5 minutes reading time)*

DIRECTIONS TO CANDIDATES

- Attempt THREE questions.
- Answer each question in a SEPARATE Writing Booklet.
- You may ask for extra Writing Booklets if you need them.

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QUESTION 23. Applied Artificial Intelligence and Expert Systems
(20 marks)

Marks

Use a SEPARATE Writing Booklet.

- | | | | |
|-----|-------|---|---|
| (a) | (i) | Robotics is a major branch of applied artificial intelligence. <ol style="list-style-type: none"> 1. Describe TWO problems for society due to the use of intelligent robots. 2. Describe TWO situations where the use of intelligent robots has been beneficial to society. | 6 |
| | (ii) | <ol style="list-style-type: none"> 1. Describe the process of training a neural network. 2. Explain the reason for training a neural network. | |
| | (iii) | Describe ONE difference between the way in which a <i>neural network</i> and an <i>expert system</i> solves a problem. | |
-
- | | | | |
|-----|------|--|---|
| (b) | (i) | Voice recognition systems have been designed for helicopter pilots. <ol style="list-style-type: none"> 1. Describe the advantages a voice recognition system might bring to this application. 2. Describe a problem that may have to be overcome when designing a voice recognition system for Royal Australian Air Force helicopter pilots. | 4 |
| | (ii) | A glass manufacturer has installed an artificial vision system that can track objects on a conveyor belt so that faulty objects are recognised and removed. <p>Describe TWO major barriers that had to be overcome in the field of artificial vision before such a system could be implemented.</p> | |

Question 23 continues on page 28

QUESTION 23. (Continued)

Marks

(c) (i) The following is a set of rules in a small expert system. **10**

- ① If wage > \$40 000 then wage is good.
- ② If years in present job > 5 then job history is good.
- ③ If assets > \$100 000 then credit risk is good.
- ④ If wage is good and job history is good then grant loan.
- ⑤ If wage is good and credit risk is good then grant loan.

Using these rules, describe how backward chaining can be used to draw conclusions in the expert system.

(ii) An expert system used in a lift has THREE rules.

- ① If the destination_floor > current floor then go up.
- ② If the destination_floor < current floor then go down.
- ③ If the destination_floor = current floor then stop.

The lift is able to store two destination_floor requests at the same time. A stored request is cancelled when the lift stops at that floor. There is a possible problem in deciding which floor to go to next.

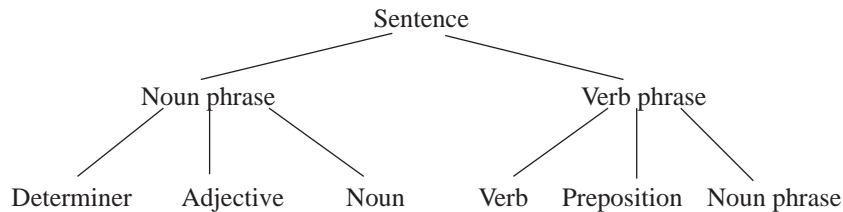
Discuss the possible problem and write additional rule(s) that will rectify it.

QUESTION 23. (Continued)

Marks

- (iii) A natural-language processor is composed of a parse tree and a lexicon. The parse tree indicates the language syntax and the lexicon gives the part of speech for every word in the language.

A simple natural-language processor has the following parse tree



and the following lexicon.

<i>Word</i>	<i>Part of speech</i>
A	Determiner
Distant	Adjective
Early	Adjective
Evening	Adjective
Hills	Noun
In	Preposition
Moon	Noun
Morning	Adjective
Over	Preposition
Rises	Verb
Sets	Verb
Shines	Verb
Slowly	Adverb
Sun	Noun
The	Determiner
West	Noun

The natural-language processor parses the following sentence correctly.

The morning sun shines over the distant hills.

- Describe why the sentence is parsed correctly.
- What change(s) to the processor system are needed so that the following sentence is also parsed correctly.

A full moon rises in the early evening.

- Redraw the parse tree so that the following sentence parses correctly.

The sun sets slowly in the west.

QUESTION 24. Computer Communications (20 marks)**Marks**

Use a SEPARATE Writing Booklet.

- (a) Explain the major difference between the following pairs of terms. **5**
- (i) *simplex mode* and *half-duplex mode*
 - (ii) *protocol* and *handshaking*
 - (iii) *X-modem* and *Z-modem*
 - (iv) *terminal* and *host computer*
 - (v) *optical fibre* and *coaxial cable*
- (b) **7**
- (i) Name ONE advantage and ONE disadvantage for a company using a leased line for communication with one of its branches.
 - (ii) List and explain TWO parameters that must be set for two computers to be able to communicate with each other.
 - (iii) Star, bus and ring are three topologies used for local area networks.
 1. Represent EACH topology diagrammatically using a square ☐ to represent a node. You must show at least FIVE nodes and the appropriate physical connections.
 2. How do EACH of the three local area network topologies handle data collision?

QUESTION 24. (Continued)

Marks

- (c) A remote database relating to Computing Studies is available on an electronic bulletin board system. A sample screen is shown below.

8

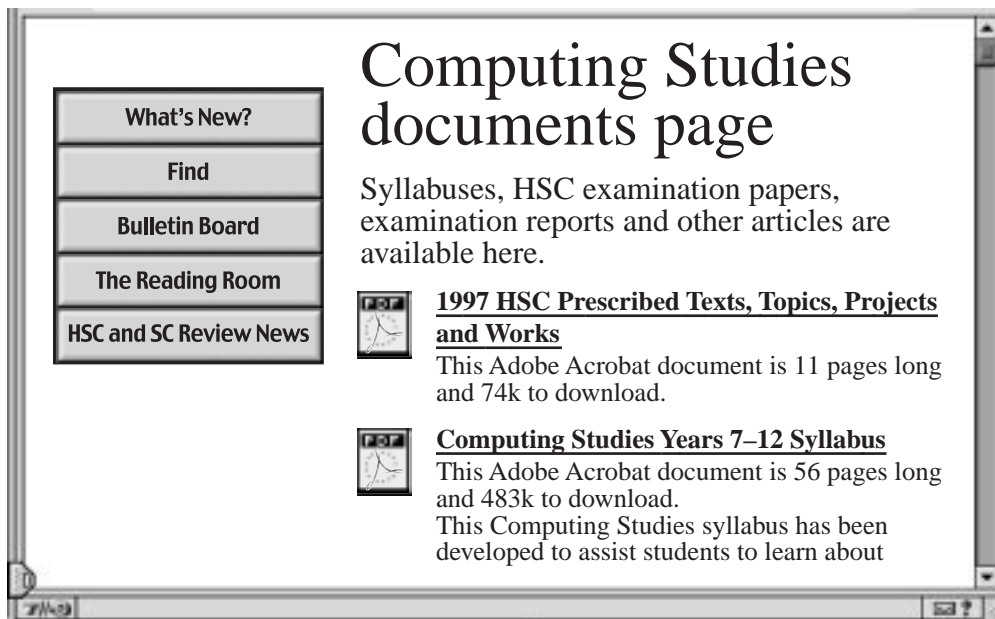


FIG 1

- (i) The information on the 1997 HSC Prescribed Texts, Topics, Projects and Works can be *downloaded* from the bulletin board by selecting the option in Figure 1.
1. Describe the process of downloading.
 2. State TWO technical factors that would affect the speed with which this information would be received by a remote computer.
- (ii) Discuss TWO advantages of publishing the 1997 HSC Prescribed Texts, Topics, Projects and Works in a remote database rather than on a CD-ROM.
- (iii) Security has been raised as an issue by the community in making any data available electronically.
1. Explain why security could be a problem.
 2. State TWO measures that the system designers could take to overcome these security problems.
- (iv) It is very easy for anyone to download information from electronic bulletin boards. Describe TWO ethical issues that may arise from this capability.

QUESTION 25. Computer-controlled Systems (20 marks)**Marks**

Use a SEPARATE Writing Booklet.

- (a) (i) What is a computer control system? **7**
- (ii) Name and give an example of TWO components of a computer control system.
- (iii) Describe TWO characteristics of a discrete control system.
- (iv) Describe TWO techniques for reducing noise in signals.
- (b) A cruise control is fitted to an automatic-drive vehicle. When activated by a button it attempts to keep the vehicle at the speed set by controlling fuel flow, changing gears when the load on the motor (engine load) becomes too great, and applying the brake if the road speed is greater than required. Engine load is measured by the change in vacuum pressure within the air delivery system. **6 push**
- The system ceases to control car speed when the release button is pushed or the driver operates the accelerator or brake pedal. When action by the system cannot control the speed of the car within 10% on either side of the set speed, a beeper is activated and continues until the cruise control is deactivated by the driver.
- (i) What type of system is the cruise control? State TWO reasons to justify your answer.
- (ii) Draw a block diagram of the cruise control system.
- (iii) Name TWO inputs and describe a suitable sensor for EACH one.

QUESTION 25. (Continued)

Marks

- (c) The control system for an automatic washing machine has a standard sequence of operations listed below. **7**

1. Fill with water of correct temperature and level
2. Agitate wash for required length of time
3. Drain wash water
4. Fill with water of correct temperature and level
5. Agitate rinse for required length of time
6. Drain rinse water
7. Spray rinse (spin while spraying with cold water—high flow rate required)
8. Spin dry

A user of the washing machine is able to select several options by pressing buttons on the control panel shown below.

WATER LEVEL			TEMPERATURE		WASH CYCLE		
low	medium	high	hot	cold	full wash	short wash	rinse

Water level and temperature can be set for any wash cycle.

The operation of each of the three wash cycles is shown in the table below.

WATER LEVEL	AGITATION TIME (minutes)	SEQUENCE OF OPERATIONS
Full wash	10	1, 2, 3, 4, 5, 6, 7, 8
Short wash	7	1, 2, 3, 4, 5, 6, 7, 8
Rinse	5	4, 5, 6, 7, 8

The washing machine ceases to operate if the water level is too low or if the spin is out of balance.

- (i)
 1. Name TWO actuators the system could use.
 2. Describe the operations of these actuators in the washing machine.
- (ii) Using pseudocode OR a flowchart, write the algorithm for the operation of the washing machine.

QUESTION 26. Computing Technologies (20 marks)**Marks**

Use a SEPARATE Writing Booklet.

- (a) (i) Copy the following table into your Writing Booklet and complete the unfilled spaces. **10**

	<i>Binary</i>	<i>Decimal</i>	<i>Hexadecimal</i>
A	10101010		
B		13	
A + B			

- (ii) Explain how negative and positive numbers are differentiated and stored in sign and modulus representation.
- (iii) What is the largest positive integer that can be represented by a 4-bit two's complement code?
- (iv) Describe how binary division may be performed using *shift* and *subtract*. Use the example of ' $12_{10} \div 4_{10}$ ' to illustrate each step of your description.
- (v) Explain the difference between the representations of 0_{10} (decimal 0) in *4-bit one's complement code* and in *4-bit two's complement code*.

QUESTION 26. (Continued)

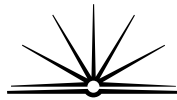
Marks

**Answer EITHER part (b)—Optical Technologies
OR part (c)—Theory and Construction of Integrated Circuits.**

EITHER

(b) Optical Technologies**10**

- (i)
1. List THREE properties of laser light.
 2. List THREE properties of optical fibres.
 3. From your lists in parts 1 and 2 above, explain why optical technologies are increasingly being used for data transmission in computer technologies.
 4. State ONE technical problem of optical fibre cable AND explain how this disadvantage is being addressed.
- (ii) Explain the process used by a laser printer to produce EACH of the following.
1. The letter D produced in Times Roman bold
 2. The Board of Studies symbol as illustrated below



3. A colour photographic image

OR

Question 26 continues on page 36

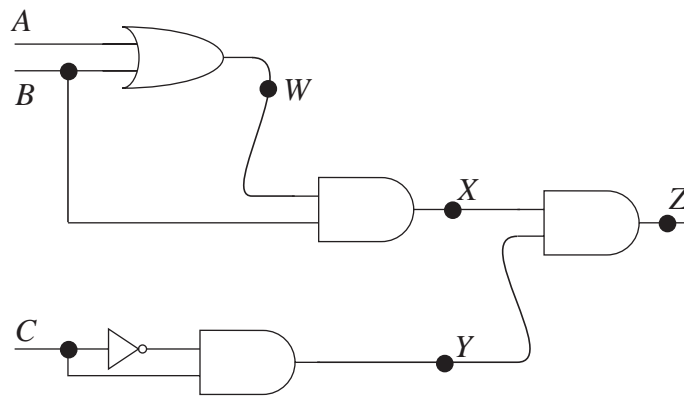
QUESTION 26. (Continued)

Marks

(c) Theory and Construction of Integrated Circuits

10

- (i) Describe the operation of a half-adder.
- (ii) With the aid of a diagram, explain how a half-adder could be used to make a full-adder.
- (iii) Using the letter 'U' (ASCII code 01010101), describe how flip-flops may be used to store this single byte of data.
- (iv) Draw a truth table for the circuit below, showing the signals at points W, X, Y and Z.



The circuit shown above can be simplified.

- (v) Draw a simpler circuit to achieve the same result using the least number of logic gates.
- (vi) What are the main steps in the manufacture of silicon chips?

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QUESTION 27. Database Design (20 marks)**Marks**

Use a SEPARATE Writing Booklet.

(a) Explain the major difference between the following pairs of terms.

5

- (i) *schema* and *data dictionary*
- (ii) *data validation* and *data verification*
- (iii) *sorting* and *selecting*
- (iv) *data security* and *data integrity*
- (v) *flat file database* and *relational database*

(b) A firm prints specialised business stationery. It has a number of customers who regularly order the same group of products. Most, but not all, products are specific to a particular customer and are printed to order.

7

The current order system uses three database files.

CUSTOMER	PRODUCT	JOB ORDER
<ul style="list-style-type: none"> • customer_address • customer_id • customer_name • date_last_order • sales_value_to_date 	<ul style="list-style-type: none"> • date_last_order • operation_details • product_description • product_id • quantity_on_hand • selling_price 	<ul style="list-style-type: none"> • customer_id • customer_order_number • date_of_order • job_order_number • order_finalised • product_description • product_id • quantity • total_cost

(i) For the JOB ORDER file, name:

1. a field that need not be present;
2. a logical field;
3. a field that enables a relationship with another file in the system.

QUESTION 27. (Continued)

Marks

Customers have complained that despite ordering a number of product items at the one time, they receive an individual invoice for each product item ordered.

To overcome this, the printing firm has decided to change its policy of one product item per job order.

- (ii) Redesign the JOB ORDER file into two or more files so that customers receive only one invoice for their whole order.
- (iii) Management wishes to identify products with excessive quantity on hand in their warehouse.

Write a search specification to find details of all products currently held in the warehouse that have not been ordered since 1 January 1998.

- (c) A charity has a database that holds details of donors and of any donations they have made during the year. The structure is as follows.

8**DONORS**

- donor_id
- donor_name
- donor_address
- donor_phone
- date_last_donation
- amount_to_date

DONATIONS

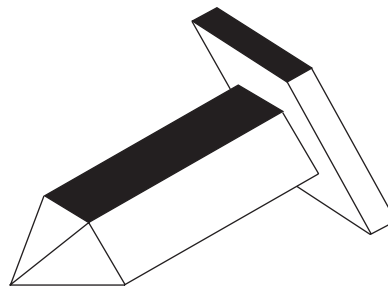
- donor_id
- donation_date
- donation_amount

- (i) What is the primary key of the DONORS file?
- (ii) Name a field in the database that is redundant. Justify your answer.
- (iii) The charity uses volunteers to go door-to-door for donations. It would like them to know who in the district already donates, so that they can be personally thanked. Modify the DONORS file so that a listing of donors by street and suburb could be easily produced.
- (iv) At the end of each financial year, for taxation purposes, a letter is sent to each person who has made a donation during the year, stating the total amount. Write down the steps required to carry out this process.
- (v) Write a statement to select out of the database the name and address of each person in the DONORS file who has NOT made a donation during the year, so that an enquiry letter can be sent.

QUESTION 28. Graphical Techniques (20 marks)**Marks**

Use a SEPARATE Writing Booklet.

- (a) Explain, using a computer graphics example, the following: 5
- (i) time code;
 - (ii) pixel averaging;
 - (iii) interlacing;
 - (iv) why a plotter may be used in preference to a laser printer;
 - (v) the use of a wire frame diagram.
- (b) The following graphic is to be drawn so that it can be displayed on a computer monitor. 8

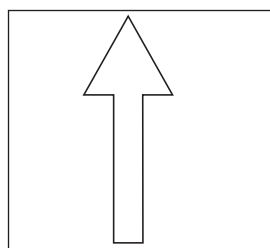


- (i) Name and describe the operation of an input device (NOT a mouse, keyboard, trackball or joystick) that could be used to create the computer graphic.
- (ii) Explain how the image would be stored in memory if it was created using:
 1. a bit-mapped software package;
 2. a vector software package.
- (iii) Explain the effect of resizing the graphic in each software package.
- (iv) Before the graphic can be displayed on a raster refresh monitor it needs to be stored in a frame buffer.
 1. Explain the purpose of a frame buffer.
 2. What must be done to the vector image stored in the RAM before it can be transferred to the frame buffer?

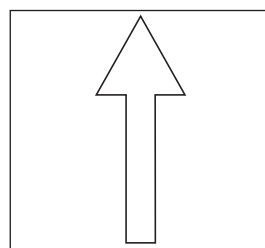
QUESTION 28. (Continued)

Marks

- (v) Reproduce the following diagrams in your Writing Booklet.



RASTER DISPLAY
MONITOR



VECTOR DISPLAY
MONITOR

Indicate clearly on EACH of the diagrams the possible direction of the electron beam that is creating the graphic image.

- (c) A World Wide Web page designer wants to insert a 16-bit image into a web page but discovers that it uses too much memory. It is decided to reduce the number of bit planes to 4. **7**

- (i) How many colours or tones can be represented using 4 bits?
- (ii) The new image must use a tonal range as close as possible to the original 16 bit image. Name and describe the graphical technique that would be used to ensure that this occurs.
- (iii) The new image occupies 300×200 pixels on the screen. Show how you would calculate the minimum memory in kilobytes required to store the image.
- (iv) The converted image is still found to occupy too much memory. Describe a method of data compression that could be used to further reduce the storage space needed.

Please turn over

QUESTION 29. Multimedia (20 marks)**Marks**

Use a SEPARATE Writing Booklet.

- (a) The Royal Agricultural Society (RAS) has decided to create a multimedia presentation about the Royal Easter Show, following its move to Homebush. The presentation is to include a history of the Show, a look at the new venue at Homebush, and a series of interviews with Show personalities. **8**
- (i) Hypertext is one major component of multimedia.
1. Name THREE other major components that could be used in the presentation.
 2. Explain using examples, how EACH of these three components might be used to enrich the presentation.
- (ii) What would be the advantages of using *hypertext* in this presentation?
- (iii) Design and draw in your answer book a title or home screen for this presentation. Indicate at least THREE design features on your drawing and justify their inclusion. Do NOT include any detailed content.
- (iv) A storyboard is used for this presentation.
1. In your Writing Booklet, create FOUR frames of a non-linear storyboard for this presentation.
 2. Discuss the purpose and use of storyboards.

QUESTION 29. (Continued)

Marks

- (b) (i) The RAS is considering releasing the final presentations in two forms. **6**
- on video
 - on CD-ROM
1. Discuss how EACH of these forms could affect the design of the presentation.
 2. Discuss the advantages and disadvantages of EACH of these forms of presentation.
- (ii) State TWO advantages and TWO disadvantages of producing similar information solely in printed (hard copy) form.
- (c) (i) In the creation of this presentation, a MIDI is used. **6**
1. What is the purpose of a MIDI? Describe the hardware needed for its use.
 2. It is unlikely that a MIDI would be used in the final presentation. Explain why?
- (ii) Before the presentation is to be finally released, it is to be evaluated by a committee. State THREE factors that should be considered during this evaluation.

End of paper

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